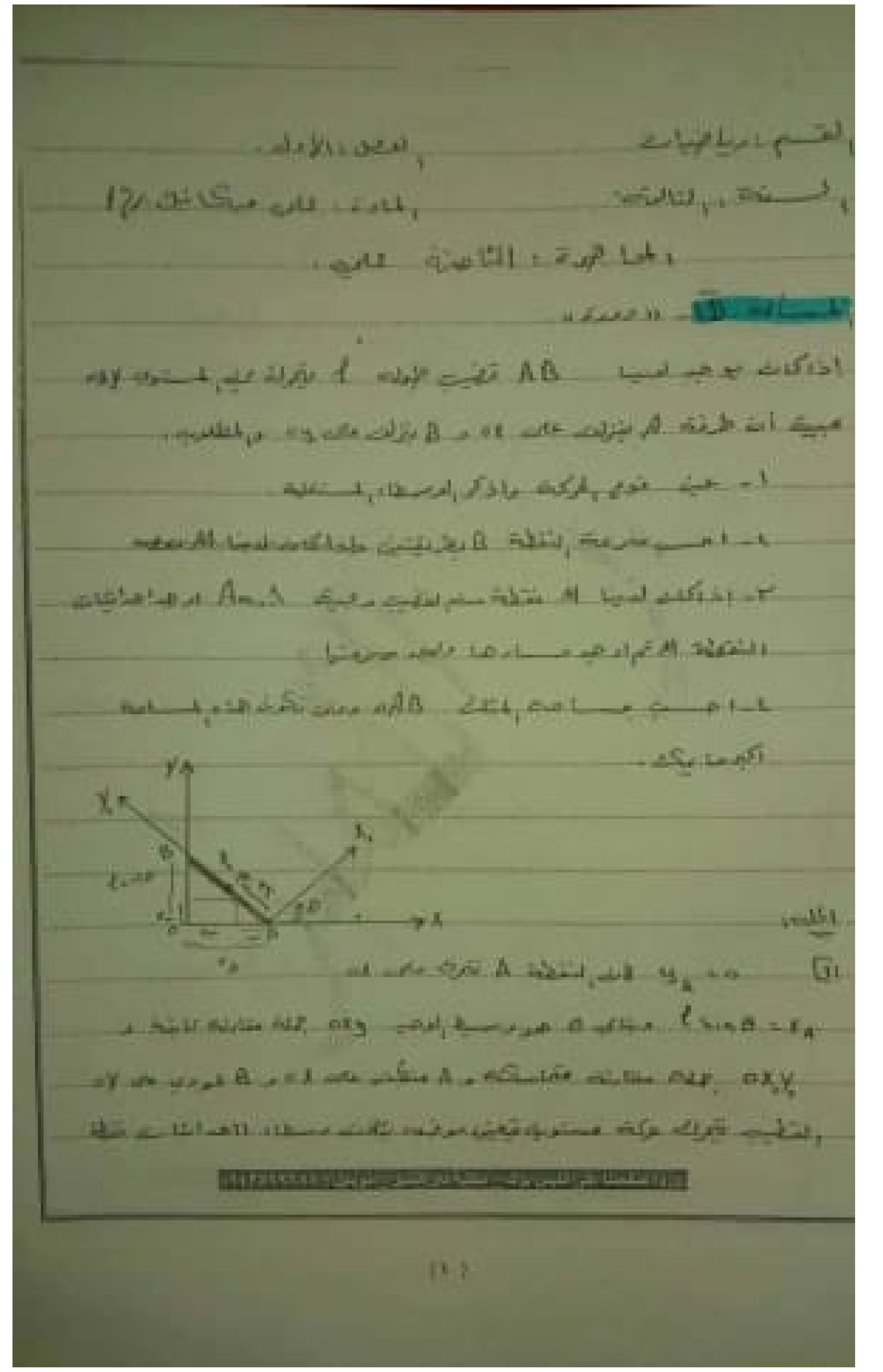


القسم: رياضيات — الفصل: الأول

السنة: الثالثة — المادة: [illegible] ميكانيك ح/1

المحاضرة: الثامنة عملي

المسألة (1): [illegible]

اذا كانت [illegible] AB [illegible] [illegible] على مستوى [illegible]

[illegible] A [illegible] B [illegible]

1- [illegible]

2- [illegible] النقطة B [illegible]

3- [illegible] A [illegible] $\hat{A}$ [illegible]

النقطة A [illegible]

4- [illegible] AB [illegible]

[illegible]

الحل:

(1) [illegible] y_B [illegible] A [illegible]

$\ell \sin\theta = x_A$ [illegible] B [illegible]

Oxy [illegible] A [illegible] B [illegible]

[illegible]

[illegible]

مراجعة السابق

2 - الطريقة الأولى

$y_B = \ell\cos\theta \Rightarrow \vec{V}(B) = \dot{y} = -\ell\dot{\theta}\sin\theta\, \vec{j}$

طريقة ثانية

$\vec{V}(B) = \vec{V}(A) + \vec{\Omega} \wedge \vec{AB} \;\ldots\ldots \Rightarrow \vec{\Omega} = \dot{\theta}\vec{k}$

$V(A) = \dot{x}_A \vec{i} = \ell\dot{\theta}\cos\theta\, \vec{i} \Rightarrow$

$x_A = \ell\sin\theta$

$\vec{AB} = \ell\vec{j_1} = \ell[-\sin\theta\, \vec{i} + \cos\theta\, \vec{j}]$

العلاقة بين ... السرعات

$V(B) = -\ell\dot{\theta}\sin\theta\, j$

ملاحظة ... مصفوفة ...

$\vec{i}_1$	j_1	k_1
$\ell\cos\theta$	$\sin\theta$	0
$\ell(-\sin\theta)$	$\cos\theta$	0
ℓ	0	0

3 - ... $x_m = \ell_1 - M$ ...

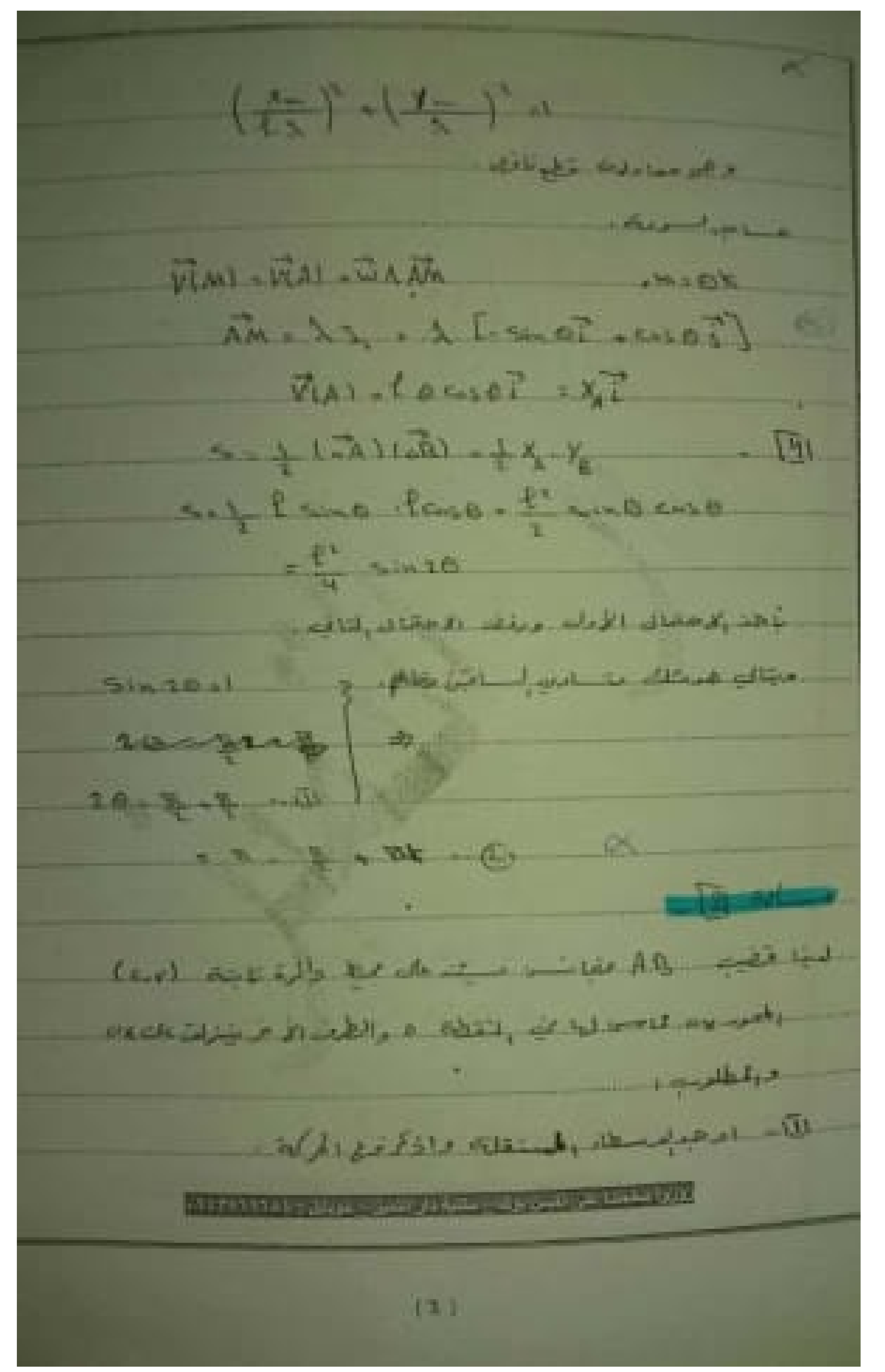
$= \ell\sin\theta - \lambda\sin\theta = (\ell - \lambda)\sin\theta$

$y_m = \lambda\cos\theta$

الحل

$\frac{x_m}{\ell - \lambda} = \sin\theta$ ---- (1)

$\frac{y_m}{\lambda} = \cos\theta$ ---- (2)



$$\left(\frac{x_M}{\ell\lambda}\right)^2+\left(\frac{y_M}{\lambda}\right)^2=1$$

[illegible]

[illegible]

$\vec V(M)=\vec V(A)+\vec\omega\wedge\vec{AM}$ [illegible]

$\vec{AM}=\lambda\vec{u}=\lambda\left[-\sin\theta\,\vec i+\cos\theta\,\vec j\right]$

$\vec V(A)=\ell\dot\theta\cos\theta\,\vec i=\dot x_A\,\vec i$

$S=\frac{1}{2}(OA)(OB)=\frac{1}{2}x_A\,y_B$ — 4)

$S=\frac{1}{2}\ell\sin\theta\;\ell\cos\theta=\frac{\ell^2}{2}\sin\theta\cos\theta$

$=\frac{\ell^2}{4}\sin 2\theta$

[illegible]

[illegible] ⟹ $\sin 2\theta=1$

⟹ $2\theta=\frac{\pi}{2}+2k\pi$

$\theta=\frac{\pi}{4}+k\pi$

$=\frac{\pi}{4}+k\pi$ — (5)

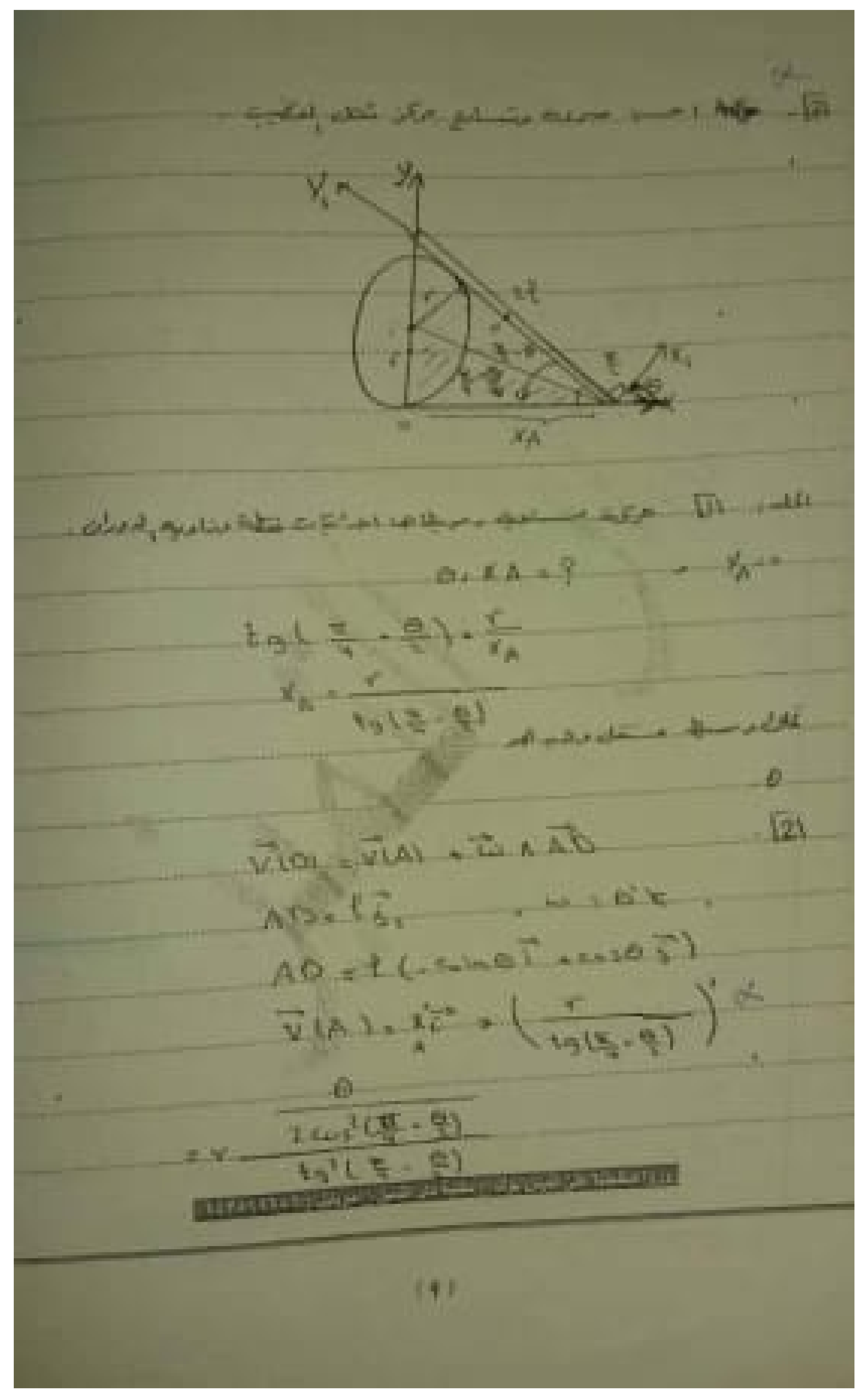
مسألة (2)

[illegible] AB [illegible] (a,b)

[illegible]

[illegible]

(1) — [illegible] (2)



$$tg\left(\frac{\pi}{4}-\frac{\theta}{2}\right)=\frac{r}{x_A}$$

$$x_A=\frac{r}{tg\left(\frac{\pi}{4}-\frac{\theta}{2}\right)}$$

2)

$$\vec{V}(D)=\vec{V}(A)+\vec{\omega}\wedge\vec{AD}$$

$$\vec{AD}=l\,\vec{y}_1 \qquad \vec{\omega}=\dot{\theta}\vec{k}$$

$$\vec{AD}=l(-\sin\theta\,\vec{i}+\cos\theta\,\vec{j})$$

$$\vec{V}(A)=\dot{x}_A\vec{i}=\left(\frac{r}{tg\left(\frac{\pi}{4}-\frac{\theta}{2}\right)}\right)'\vec{i}$$

$$=r\,\frac{\frac{\dot{\theta}}{2\cos^2\left(\frac{\pi}{4}-\frac{\theta}{2}\right)}}{tg^2\left(\frac{\pi}{4}-\frac{\theta}{2}\right)}$$

